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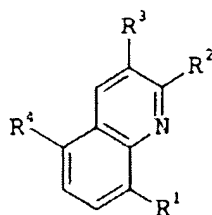


WILHELM SCHEFFEL et al.

Serial No. 09/763,704

COPY OF ALL CLAIMS

1. A cyclohexenonequinolinoyl derivative of the formula I



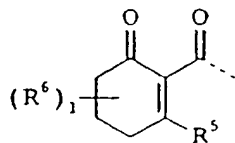
where:

R¹ is hydrogen, nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxyiminomethyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, aminosulfonyl, N-(C₁-C₆-alkyl)aminosulfonyl, N, N-di-(C₁-C₆-alkyl)aminosulfonyl, N-(C₁-C₆-alkylsulfonyl)amino, N-(C₁-C₆-haloalkylsulfonyl)amino, N-(C₁-C₆-alkyl)-N-(C₁-C₆-alkylsulfonyl)amino, N-(C₁-C₆-alkyl)-N-(C₁-C₆-haloalkylsulfonyl)amino, phenoxy, heterocycloxy, phenylthio or heterocyclylthio, where the four last-mentioned radicals may be partially or fully halogenated and/or may carry one to three of the following substituents :

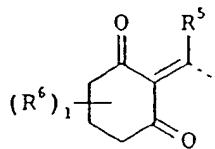
nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R^2, R^3 are hydrogen, C_1 - C_6 -alkyl, C_1 - C_6 -haloalkyl or halogen;

R^4 is a compound IIa or IIb



IIa



IIb

where

R^5 is halogen, OR^7 , SR^7 , SOR^8 , SO_2R^8 , OSO_2R^8 , POR^8R^9 , OPR^8R^9 , $OPOR^8R^9$, $OPSR^8R^9$, $NR^{10}R^{11}$, $ONR^{11}R^{12}$, N-linked heterocyclyl or O-(N-linked heterocyclyl), where the heterocyclyl radical of the two last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:

nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy or C_1 - C_4 -haloalkoxy;

R^6 is nitro, halogen, cyano, C_1 - C_6 -alkyl, C_1 - C_6 -haloalkyl, di-(C_1 - C_6 -alkoxy)methyl, di-(C_1 - C_6 -alkylthio)methyl, (C_1 - C_6 -alkoxy)(C_1 - C_6 -alkylthio)methyl, hydroxyl, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkoxy, C_1 - C_6 -alkoxycarbonyloxy, C_1 - C_6 -alkylthio, C_1 - C_6 -haloalkylthio, C_1 - C_6 -alkylsulfinyl, C_1 - C_6 -haloalkylsulfinyl, C_1 - C_6 -alkylsulfonyl, C_1 - C_6 -haloalkylsulfonyl, C_1 - C_6 -alkylcarbonyl, C_1 - C_6 -haloalkylcarbonyl, C_1 - C_6 -alkoxycarbonyl or C_1 - C_6 -haloalkoxycarbonyl;

or

two radicals , which are linked to the same carbon,
together form an $-O-(CH_2)_m-O-$, $-O-(CH_2)_m-S-$, $-S-(CH_2)_m-S-$, $-O-(CH_2)_n-$ or $-S-(CH_2)_n-$ chain which may be substituted by
one to three radicals from the following group:
halogen, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl or C_1-C_4 -
alkoxycarbonyl;

or

two radicals , which are linked to the same carbon,
together form a $-(CH_2)_p$ chain which may be interrupted by
oxygen or sulfur and/or may be substituted by one to four
radicals from the following group:
halogen, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl or C_1-C_4 -
alkoxycarbonyl;

or

two radicals , which are linked to the same carbon,
together form a methyldene group which may be substituted by
one or two radicals from the following group:
halogen, hydroxyl, formyl, cyano, C_1-C_6 -alkyl, C_1-C_6 -
haloalkyl, C_1-C_6 -alkoxy, C_1-C_6 -haloalkoxy, C_1-C_6 -alkylthio, C_1 -
 C_6 -haloalkylthio, C_1-C_6 -alkylsulfinyl, C_1-C_6 -haloalkylsulfinyl,
 C_1-C_6 -alkylsulfonyl or C_1-C_6 -haloalkylsulfonyl;

or

two radicals , which are linked to the same carbon,
together with this carbon form a carbonyl group;

or

two radicals , which are linked to different carbons,
together form a $-(CH_2)_n$ chain which may be substituted by
one to three radicals from the following group:
halogen, C_1-C_6 -alkyl, C_1-C_6 -alkoxy, hydroxyl or C_1-C_6 -
alkoxycarbonyl;

R^7 is C_1 - C_6 -alkyl, C_3 - C_6 -alkenyl, C_3 - C_6 -haloalkenyl,
 C_3 - C_6 -alkynyl, C_3 - C_6 -haloalkynyl, C_3 - C_6 -cycloalkyl,
 C_1 - C_{20} -alkylcarbonyl, C_2 - C_6 -alkenylcarbonyl,
 C_2 - C_6 -alkynylcarbonyl, C_3 - C_6 -cycloalkylcarbonyl,
 C_1 - C_6 -alkoxycarbonyl, C_3 - C_6 -alkenyloxy carbonyl,
 C_3 - C_6 -alkynyloxy carbonyl,
 $(C_1$ - C_{20} -alkylthio)carbonyl,
 C_1 - C_6 -alkylaminocarbonyl,
 C_3 - C_6 -alkenylaminocarbonyl,
 C_3 - C_6 -alkynylaminocarbonyl,
 N,N -di- $(C_1$ - C_6 -alkyl)aminocarbonyl,
 N -(C_3 - C_6 -alkenyl)- N -(C_1 - C_6 -alkyl) aminocarbonyl ,
 N -(C_3 - C_6 -alkynyl)- N -(C_1 - C_6 -alkyl) aminocarbonyl ,
 N -(C_1 - C_6 -alkoxy)-
 N -(C_1 - C_6 -alkyl) aminocarbonyl , N -(C_3 - C_6 -alkenyl)-
 N -(C_1 - C_6 -alkoxy) aminocarbonyl , N -(C_3 - C_6 -alkynyl)-
 N -(C_1 - C_6 -alkoxy) aminocarbonyl, di- $(C_1$ - C_6 -alkyl)-
aminothiocarbonyl, C_1 - C_6 -alkylcarbonyl- C_1 - C_6 -alkyl,
 C_1 - C_6 -alkoxyimino- C_1 - C_6 -alkyl,
 N -(C_1 - C_6 -alkylamino) imino- C_1 - C_6 -alkyl or
 N,N -di- $(C_1$ - C_6 -alkylamino)imino- C_1 - C_6 -alkyl, where
the above-mentioned alkyl, cycloalkyl and alkoxy radicals may be partially
or fully halogenated and/or may carry one to three of the following groups:
cyano, C_1 - C_4 -alkoxy, C_1 - C_4 -alkylthio, di- $(C_1$ - C_4 -alkyl)amino,
 C_1 - C_4 -alkylcarbonyl, C_1 - C_4 -alkoxycarbonyl, C_1 - C_4 -alkoxy- C_1 -
 C_4 -alkoxycarbonyl, di- $(C_1$ - C_4 -alkyl)amino- C_1 - C_4 -
alkoxycarbonyl, hydroxycarbonyl, C_1 - C_4 -alkylaminocarbonyl,
di- $(C_1$ - C_4 -alkyl)aminocarbonyl, aminocarbonyl, C_1 - C_4 -

alkylcarbonyloxy or C₃-C₆-cycloalkyl;
 phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl, heterocyclyl-C₁-C₆-
 alkyl, phenylcarbonyl-C₁-C₆-alkyl, heterocyclylcarbonyl-C₁-
 C₆-alkyl, phenylcarbonyl, heterocyclylcarbonyl,
 phenoxy carbonyl, heterocycliloxy carbonyl,
 phenoxythiocarbonyl, heterocycliloxythiocarbonyl, phenoxy-
 C₁-C₆-alkylcarbonyl, heterocycliloxy-C₁-C₆-alkylcarbonyl,
 phenylaminocarbonyl, N-(C₁-C₆-alkyl)-N-
 (phenyl)aminocarbonyl, heterocyclylaminocarbonyl, N-(C₁-
 C₆-alkyl)-N-(heterocyclyl)aminocarbonyl, phenyl-C₂-C₆-
 alkenylcarbonyl or heterocyclyl-C₂-C₆-alkenylcarbonyl, where
 the phenyl and the heterocyclyl radical of the 20 last-
 mentioned substituents may be partially or fully halogenated
 and/or may carry one to three of the following radicals:
 nitro, cyano, C₁-C₄-alkyl, C₁-C₄-halogenalkyl, C₁-C₄-alkoxy or
 C₁-C₄-haloalkoxy;

R⁸, R⁹ are C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-
 alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, hydroxyl, C₁-C₆-
 alkoxy, amino, C₁-C₆-alkylamino, C₁-C₆-haloalkylamino, di-
 (C₁-C₆-alkyl) amino or di-(C₁-C₆-haloalkyl) amino, where the
 abovementioned alkyl, cycloalkyl and alkoxy radicals may be
 partially or fully halogenated and/or may carry one to three
 of the following groups:
 cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄- alkyl) amino,
 C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-
 C₄-alkoxycarbonyl, di-(C₁-C₄-alkyl) amino-C₁-C₄-
 alkoxycarbonyl,
 hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-
 alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy

or C₃-C₆-cycloalkyl;

phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl, heterocyclyl-C₁-C₆-alkyl, phenoxy, heterocycloxy, where the phenyl and the heterocyclyl radical of the last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹⁰ is C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, hydroxyl, C₁-C₆-alkoxy, C₃-C₆-alkenyloxy, C₃-C₆-alkynyloxy, amino, C₁-C₆-alkylamino, di-(C₁-C₆-alkyl)amino or C₁-C₆-alkylcarbonylamino, where the abovementioned alkyl, cycloalkyl and alkoxy radicals may be partially or fully halogenated and/or may carry one to three radicals from the following group:

cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl)amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di-(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl or heterocyclyl-C₁-C₆-alkyl, where the phenyl or heterocyclyl radical of the four last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹¹, R¹² are C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₁-C₆-alkylcarbonyl;

I is 0 to 6;

m is 2 to 4;

n is 1 to 5;

p is 2 to 5;

and their agriculturally useful salts.

2. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 1 where

R¹ is halogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy, C₁-C₆-alkylthio, heterocycloxy or phenylthio, where the two last-mentioned radicals may be partially or fully halogenated and/or may carry one to three of the substituents mentioned below:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R⁵ is halogen, OR⁷, SR⁷, SOR⁸, SO₂R⁸, OSO₂R⁸, OPR⁸R⁹, OPOR⁸R⁹, OPSR⁸R⁹, NR¹⁰R¹¹ or N-bonded heterocyclyl which may be partially or fully halogenated and/or may carry one to three of the following radicals: nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy.

3. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 1, where

R⁵ is halogen, OR⁷, NR¹⁰R¹¹ or N-bonded heterocyclyl which may be partially or fully halogenated and/or may carry one to three of the following radicals: nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy.

4. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 1, where

R⁷ is C₁-C₆-alkyl, C₁-C₂₀-alkylcarbonyl, C₁-C₆-alkoxycarbonyl, (C₁-C₂₀-alkylthio)carbonyl, N,N-di-(C₁-C₆-alkyl)aminocarbonyl, phenyl, phenylcarbonyl or phenoxy-C₁-C₆-alkylcarbonyl, where the phenyl radical of the three last-mentioned substituents may be partially or fully halogenated and/or may carry

one to three of the following radicals:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹⁰ is C₁-C₆-alkyl or C₁-C₆-alkoxy;

R¹¹ is C₁-C₆-alkyl.

5. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 1, where

R⁶ is nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, di-(C₁-C₆-alkoxy)methyl, di-(C₁-C₆-alkylthio)methyl, (C₁-C₆-alkoxy)(C₁-C₆-alkylthio)-methyl, hydroxyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkoxycarbonyloxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, C₁-C₆-alkylcarbonyl, C₁-C₆-haloalkylcarbonyl, C₁-C₆-alkoxycarbonyl or C₁-C₆-haloalkoxycarbonyl;

or

two radicals, which are linked to the same carbon, together form an -O-(CH₂)_m-O-, -O-(CH₂)_m-S-, -S-(CH₂)_m-S-, -O-(CH₂)_n- or -S-(CH₂)_n chain which may be substituted by one to three radicals from the following group:

halogen, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl or C₁-C₄-alkoxycarbonyl;

or

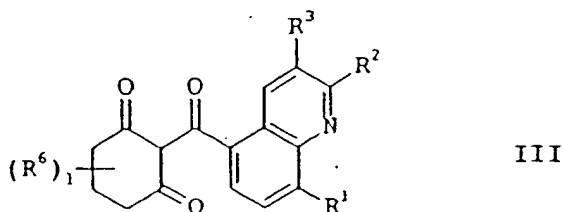
two radicals, which are linked to the same carbon, together form a -(CH₂)_p chain which may be interrupted by oxygen or sulfur and/or may be substituted by one to four radicals from the following group:

halogen, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl or C₁-C₄-alkoxycarbonyl;

or

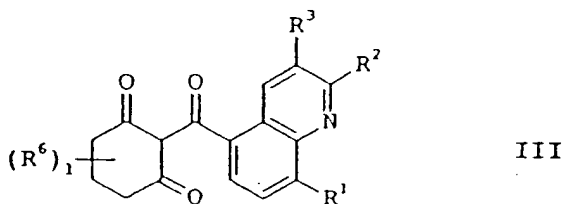
two radicals, which are linked to the same carbon, together with this carbon form a carbonyl group.

6. A process for preparing compounds of the formula I as claimed in claim 1 where $R^5 = \text{halogen}$, which comprises reacting a cyclohexanedione derivative of the formula III,

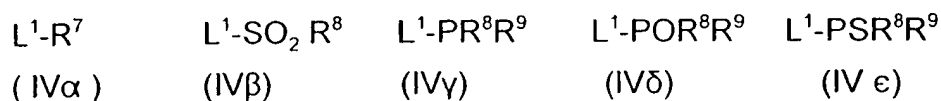


where the variables R^1 to R^3 , and I are each as defined in claim 1, with a halogenating agent.

7. A process for preparing compounds of the formula I as claimed in claim 1 where $R^5 = OR^7, OSO_2R^8, OPR^8R^9, OPOR^8R^9$ or $OPSR^8R^9$, which comprises reacting a cyclohexanedione derivative of the formula III,

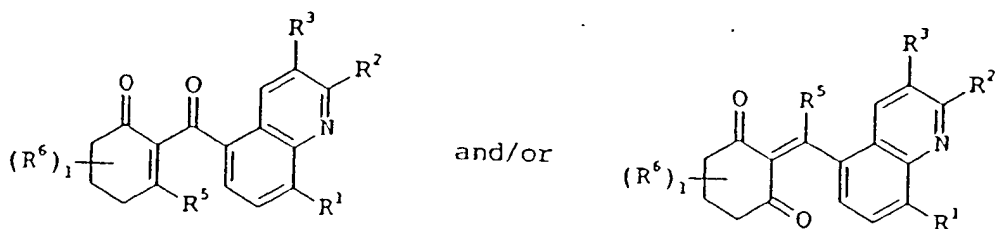


where the variables R^1 to R^3 , and I are each as defined in claim 1, with a compound of the formula IV α , IV β , IV γ , IV δ or IV ϵ ,



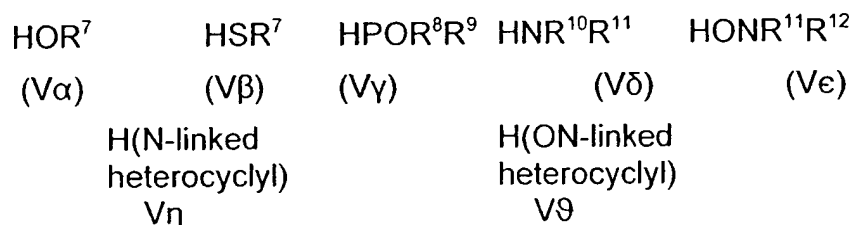
where the variables R^7 to R^9 are each as defined in claim 1 and L^1 is a nucleophilically replaceable leaving group.

8. A process for preparing compounds of the formula I as claimed in claim 1 where $R^5 = OR^7, SR^7, POR^8R^9, NR^{10}R^{11}, ONR^{11}R^{12}$, N-linked heterocyclyl or O-(N-linked heterocyclyl), which comprises reacting a compound of the formula I α (\equiv I where $R^5 = \text{halogen}, OSO_2R^8$),



I where $R^5 = \text{halogen or } \text{OSO}_2R^8$

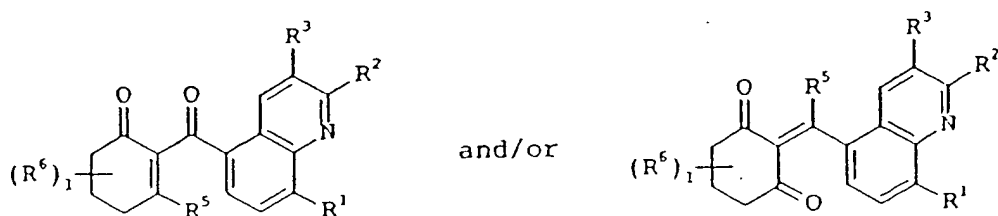
where the variables R^1 to R^3 , R^6 and I are each as defined in claim 1, with a compound of the formula $V\alpha, V\beta, V\gamma, V\delta, V\epsilon, V\eta, V\theta$,



where the variables R^7 to R^{12} are each as defined in claim 1, if appropriate

in the presence of a base.

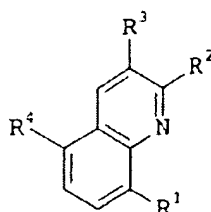
9. A process for preparing compounds of the formula I as claimed in claim 1, where $R^5 = \text{SOR}^8, \text{SO}_2R^8$, which comprises reacting a compound of the formula I β (\equiv I where $R^5 = \text{SR}^8$),



I where $R^5 = \text{SR}^8$

where the variables R^1 to R^8 and I are each as defined in claim 1, with an oxidizing agent.

10. A composition, comprising a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I as claimed in claim 1 and auxiliaries which are customarily used for formulating crop protection agents.
11. A process for preparing compositions as claimed in claim 10, which comprises mixing a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I and auxiliaries which are customarily used for formulating crop protection agents.
12. A method for controlling undesirable vegetation, which comprises allowing a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I as claimed in claim 1 to act on plants, their habitat and/or on seeds.
13. The use of cyclohexenonequinolinoyl derivatives of the formula I or their agriculturally useful salts as claimed in claim 1 as herbicides.
14. A cyclohexenonequinolinoyl derivative of the formula I



where:

R^1 is hydrogen, nitro, halogen, cyano, C_1 - C_6 -alkyl, C_1 - C_6 -haloalkyl, C_1 - C_6 -alkoxyiminomethyl, C_1 - C_6 -alkoxy, C_1 - C_6 -haloalkoxy, C_1 - C_6 -alkylthio, C_1 - C_6 -

haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, aminosulfonyl, N-(C₁-C₆-alkyl)aminosulfonyl,

N, N-di-(C₁-C₆-alkyl) aminosulfonyl,

N-(C₁-C₆-alkylsulfonyl)amino,

N-(C₁-C₆-haloalkylsulfonyl)amino,

N-(C₁-C₆-alkyl)-N-(C₁-C₆-alkylsulfonyl)amino,

N-(C₁-C₆-alkyl)-N-(C₁-C₆-haloalkylsulfonyl)amino,

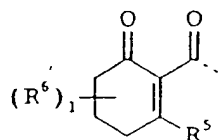
phenoxy, heterocycloxy, phenylthio or heterocyclylthio, where the four last-mentioned radicals may be partially or fully halogenated and/or may carry one to three of the following substituents :

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl,

C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R², R³ are hydrogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl or halogen;

R⁴ is a compound IIa



IIa

where

R⁵ is halogen, OR⁷, SR⁷, SOR⁸, SO₂R⁸, OSO₂R⁸, POR⁸R⁹,

OPR⁸R⁹, OPOR⁸R⁹, OPSR⁸R⁹, NR¹⁰R¹¹, ONR¹¹R¹², N-linked

heterocyclyl or O-(N-linked heterocyclyl), where the

heterocyclyl radical of the two last-mentioned substituents

may be partially or fully halogenated and/or may carry one to

three of the following radicals:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R⁷ is C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, C₁-C₂₀-alkylcarbonyl, C₂-C₆-alkenylcarbonyl, C₂-C₆-alkynylcarbonyl, C₃-C₆-cycloalkylcarbonyl, C₁-C₆-alkoxycarbonyl, C₃-C₆-alkenyloxycarbonyl, C₃-C₆-alkynyloxycarbonyl, (C₁-C₂₀-alkylthio)carbonyl, C₁-C₆-alkylaminocarbonyl, C₃-C₆-alkenylaminocarbonyl, C₃-C₆-alkynylaminocarbonyl, N,N-di-(C₁-C₆-alkyl)aminocarbonyl, N-(C₃-C₆-alkenyl)-N-(C₁-C₆-alkyl)aminocarbonyl, N-(C₃-C₆-alkynyl)-N-(C₁-C₆-alkyl)aminocarbonyl, N-(C₁-C₆-alkoxy)-N-(C₁-C₆-alkyl)aminocarbonyl, N-(C₃-C₆-alkenyl)-N-(C₁-C₆-alkoxy)aminocarbonyl, N-(C₃-C₆-alkynyl)-N-(C₁-C₆-alkoxy)aminocarbonyl, di-(C₁-C₆-alkyl)aminothiocarbonyl, C₁-C₆-alkylcarbonyl-C₁-C₆-alkyl, C₁-C₆-alkoxyimino-C₁-C₆-alkyl, N-(C₁-C₆-alkylamino)imino-C₁-C₆-alkyl or N,N-di-(C₁-C₆-alkylamino)imino-C₁-C₆-alkyl, where

the above-mentioned alkyl, cycloalkyl and alkoxy radicals may be partially or fully halogenated and/or may carry one to three of the following groups: cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl)amino, C₁-C₄-

alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di-(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl; phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl, heterocyclyl-C₁-C₆-alkyl, phenylcarbonyl-C₁-C₆-alkyl, heterocyclylcarbonyl-C₁-C₆-alkyl, phenylcarbonyl, heterocyclylcarbonyl, phenoxycarbonyl, heterocycloxy carbonyl, phenoxythiocarbonyl, heterocycloxythiocarbonyl, phenoxy-C₁-C₆-alkylcarbonyl, heterocycloxy-C₁-C₆-alkylcarbonyl, phenylaminocarbonyl, N-(C₁-C₆-alkyl)-N-(phenyl)aminocarbonyl, heterocyclylaminocarbonyl, N-(C₁-C₆-alkyl)-N-(heterocyclyl)aminocarbonyl, phenyl-C₂-C₆-alkenylcarbonyl or heterocyclyl-C₂-C₆-alkenylcarbonyl, where the phenyl and the heterocyclyl radical of the 20 last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals: nitro, cyano, C₁-C₄-alkyl, C₁-C₄-halogenalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R⁸, R⁹ are C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, hydroxyl, C₁-C₆-alkoxy, amino, C₁-C₆-alkylamino, C₁-C₆-haloalkylamino, di-(C₁-C₆-alkyl) amino or di-(C₁-C₆-haloalkyl) amino, where the abovementioned alkyl, cycloalkyl and alkoxy radicals may be partially or fully halogenated and/or may carry one to three of the following groups: cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl) amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di-(C₁-C₄-alkyl) amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy

or C₃-C₆-cycloalkyl;

phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl, heterocyclyl-C₁-C₆-alkyl, phenoxy, heterocycloxy, where the phenyl and the heterocyclyl radical of the last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹⁰ is C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, hydroxyl, C₁-C₆-alkoxy, C₃-C₆-alkenyloxy, C₃-C₆-alkynyloxy, amino, C₁-C₆-alkylamino, di-(C₁-C₆-alkyl)amino or C₁-C₆-alkylcarbonylamino, where the abovementioned alkyl, cycloalkyl and alkoxy radicals may be partially or fully halogenated and/or may carry one to three radicals from the following group:

cyano, C₁-C₄-alkoxy, C₁-C₄-alkylthio, di-(C₁-C₄-alkyl)amino, C₁-C₄-alkylcarbonyl, C₁-C₄-alkoxycarbonyl, C₁-C₄-alkoxy-C₁-C₄-alkoxycarbonyl, di-(C₁-C₄-alkyl)amino-C₁-C₄-alkoxycarbonyl, hydroxycarbonyl, C₁-C₄-alkylaminocarbonyl, di-(C₁-C₄-alkyl)aminocarbonyl, aminocarbonyl, C₁-C₄-alkylcarbonyloxy or C₃-C₆-cycloalkyl;

phenyl, heterocyclyl, phenyl-C₁-C₆-alkyl or heterocyclyl-C₁-C₆-alkyl, where the phenyl or heterocyclyl radical of the four last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:

nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R¹¹, R¹² are C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-alkynyl or C₁-C₆-alkylcarbonyl;

I is 0;

and their agriculturally useful salts.

15. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 14, where

R^1 is halogen, C_1 - C_6 -alkyl, C_1 - C_6 -haloalkyl, C_1 - C_6 -alkoxy, C_1 - C_6 -alkylthio, heterocycloxy or phenylthio, where the two last-mentioned radicals may be partially or fully halogenated and/or may carry one to three of the substituents mentioned below:

nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy or C_1 - C_4 -haloalkoxy;

R^5 is halogen, OR^7 , SR^7 , SOR^8 , SO_2R^8 , OSO_2R^8 , OPR^8R^9 , $OPOR^8R^9$, $OPSR^8R^9$, $NR^{10}R^{11}$ or N-bonded heterocyclyl which may be partially or fully halogenated and/or may carry one to three of the following radicals: nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy or C_1 - C_4 -haloalkoxy.

16. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 14, where

R^5 is halogen, OR^7 , $NR^{10}R^{11}$ or N-bonded heterocyclyl which may be partially or fully halogenated and/or may carry one to three of the following radicals:

nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy or C_1 - C_4 -haloalkoxy.

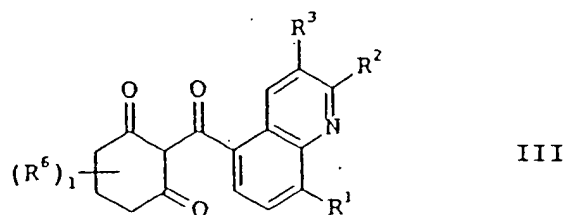
17. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 14, where

R^7 is C_1 - C_6 -alkyl, C_1 - C_{20} -alkylcarbonyl, C_1 - C_6 -alkoxycarbonyl, $(C_1$ - C_{20} -alkylthio)carbonyl, N,N-di- $(C_1$ - C_6 -alkyl)aminocarbonyl, phenyl, phenylcarbonyl or phenoxy- C_1 - C_6 -alkylcarbonyl, where the phenyl radical of the three last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals: nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy or C_1 - C_4 -haloalkoxy;

R^{10} is C_1 - C_6 -alkyl or C_1 - C_6 -alkoxy;

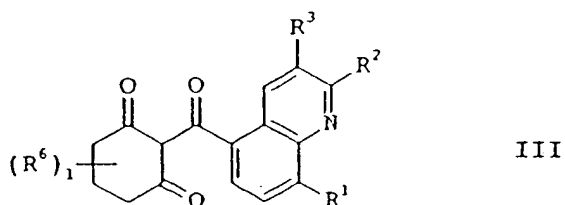
R^{11} is C_1 - C_6 -alkyl.

18. A process for preparing compounds of the formula I as claimed in claim 14 where $R^5 = \text{halogen}$, which comprises reacting a cyclohexanedione derivative of the formula III,

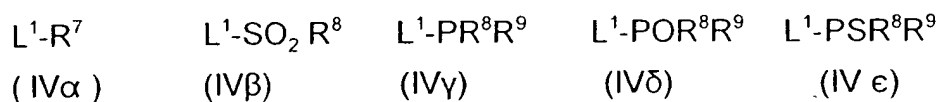


where the variables R^1 to R^3 , and I are each as defined in claim 14, with a halogenating agent.

19. A process for preparing compounds of the formula I as claimed in claim 14 where $R^5 = OR^7$, OSO_2R^8 , OPR^8R^9 , $OPOR^8R^9$ or $OPSR^8R^9$, which comprises reacting a cyclohexanedione derivative of the formula III,

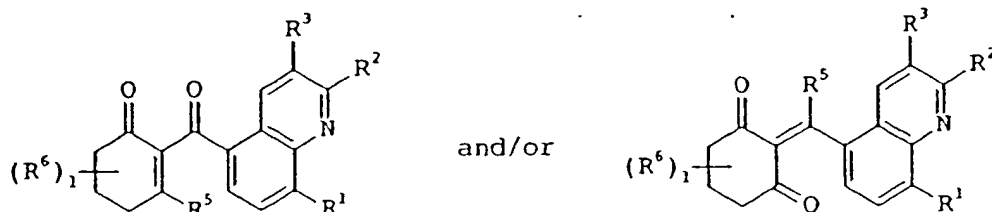


where the variables R^1 to R^3 , and I are each as defined in claim 14, with a compound of the formula IV α , IV β , IV γ , IV δ or IV ϵ ,



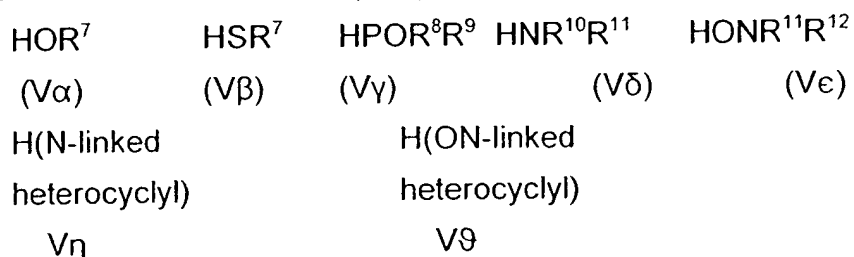
where the variables R^7 to R^9 are each as defined in claim 14 and L^1 is a nucleophilically replaceable leaving group.

20. A process for preparing compounds of the formula I as claimed in claim 14 where $R^5 = OR^7, SR^7, POR^8R^9, NR^{10}R^{11}, ONR^{11}R^{12}$, N-linked heterocyclyl or O-(N-linked heterocyclyl), which comprises reacting a compound of the formula I α (\equiv I where $R^5 = \text{halogen}, OSO_2R^8$),



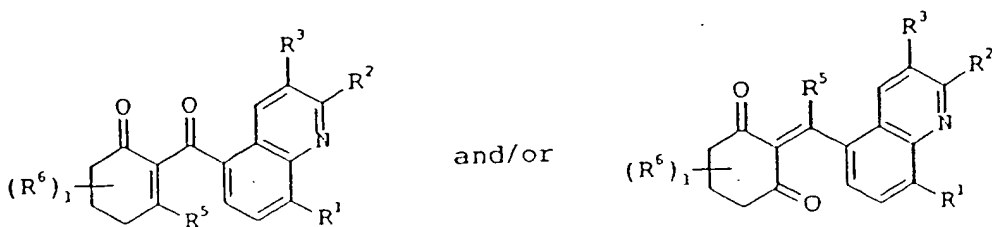
I where $R^5 = \text{halogen or } OSO_2R^8$

where the variables R^1 to R^3 , and I are each as defined in claim 14, with a compound of the formula $V\alpha, V\beta, V\gamma, V\delta, V\epsilon, V\eta, V\theta$,



where the variables R^7 to R^{12} are each as defined in claim 14, if appropriate in the presence of a base.

21. A process for preparing compounds of the formula I as claimed in claim 14 where $R^5 = SOR^8, SO_2R^8$, which comprises reacting a compound of the formula I β (\equiv I where $R^5 = SR^8$),



I where $R^5 = SR^8$

where the variables R^1 to R^5 , R^7 , R^8 and I are each as defined in claim 14, with an oxidizing agent.

22. A composition, comprising a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I as claimed in claim 14 and auxiliaries which are customarily used for formulating crop protection agents.
23. A process for preparing compositions as claimed in claim 22, which comprises mixing a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I and auxiliaries which are customarily used for formulating crop protection agents.
24. A method for controlling undesirable vegetation, which comprises allowing a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of formula I as claimed in claim 14 to act on plants, their habitat and/or on seeds.
25. The use of cyclohexenonequinolinoyl derivatives of the formula I or their agriculturally useful salts as claimed in claim 14 as herbicides.